WE CLAIM:

1. A method of making a glass ceramic optoelectronic material comprising:
   a) preparing a glass composition to yield a precursor glass for a nanocrystalline glass ceramic doped with at least one kind of optically active ion, the precursor glass having a crystallization temperature;
   b) forming the precursor glass into a glass cane;
   c) surrounding the glass cane with a chemically inert cladding material;
   d) forming from the glass cane an optical component at a temperature above the crystallization temperature of the precursor glass;
   e) heat treating at least a portion of the optical component to develop nanocrystals within the precursor glass, thereby forming a glass ceramic.

2. The method in accordance with claim 1, wherein the optically active ion is selected from transition metals and lanthanides.

3. The method in accordance with claim 2, wherein the transition metals with which the glass-ceramic is doped are selected from the group consisting of Ti, V, Cr, Mn, Co, Ni, Cu, or Fe.

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4. The method in accordance with claim 3, wherein the transition metals with which the glass-ceramic is doped are selected from the group consisting of Cr, Ni, or Co.

5. The method in accordance with claim 2, wherein the lanthanides with which the glass-ceramic is doped are selected from the group consisting of Er, Tm, Nd, Pr, Yb, Dy, or Ho.

6. The method in accordance with claim 1, wherein the nanocrystals are not larger than about 50 nm in size.

7. The method in accordance with claim 1, wherein the optoelectronic material is in the form of a clad optical fiber.

8. The method in accordance with claim 7, wherein the optical fiber cladding is a silica glass modified by at least one oxide selected from the group composed of B, Ge, P, Ga, Al, Ta, Ti, or Sb oxides.

9. The method in accordance with claim 8, wherein the optical fiber is a silica glass modified by an oxide selected from the group consisting of B_2O_3, GeO_2, and P_2O_5.

10. The method in accordance with claim 7, wherein the glass-ceramic forms a core of the optical fiber, the core has a CTE in the range of $10\text{-}90\text{x}10^{-7}/°C$, and the cladding has a CTE in the range of $5\text{-}70\text{x}10^{-7}/°C$.

11. The method in accordance with claim 10, wherein the glass-ceramic core has a CTE in the range of $20\text{-}70\text{x}10^{-7}/°C$, and the cladding has a CTE in the range of $15\text{-}60\text{x}10^{-7}/°C$.

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12. A method of making a nanocrystalline glass ceramic optical fiber having a core that is doped with at least one kind of optically active ion, the method comprising:

a) forming a precursor glass cane;
b) creating a cladding material of modified silica;
c) combining the precursor glass cane into the cladding material;
d) drawing the combined precursor glass cane and cladding material at a temperature above crystallization of the precursor glass, and below the kinetic crystallization temperature of the cladding material;
e) heat treating the draw clad fiber under conditions that promote nanocrystal formation within the core to form a glass ceramic.

13. A method of producing a clad optical fiber, the method comprises melting a batch to yield a precursor glass for a nanocrystalline glass-ceramic that is doped with a transition metal, forming a glass cane from the precursor glass melt, mechanically incorporating the glass cane into a cladding tube, drawing a composite glass fiber at a temperature slightly above the liquidus temperature of the drawn composite glass fiber, and subsequently heat treating at least a portion of the clad glass fiber under conditions to develop nanocrystals therein.

14. The method in accordance with claim 1 or 13, which further comprises applying to the glass fiber a cladding glass that is sufficiently viscous at the drawing temperature to permit it to be drawn at a temperature where the core glass, though fluid, and has a sufficiently low vapor pressure to avoid appreciable volatilization.

15. The method in accordance with claim 1 or 13, which further comprises forming the cladding glass by a chemical vapor deposition (CVD) process.

16. The method in accordance with claim 1 or 13, which further comprises cladding the glass fiber with a batch adapted to provide a glass consisting essentially of silica and at least one modifying oxide, the glass thus provided having a softening point of at least about 900 °C.

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17. The method in accordance with claim 16, which further comprises cladding the fiber with a glass having a composition consisting essentially of silica and at least one oxide selected from the group consisting of B, Ge and P.

18. An optical fiber comprising: a nanocrystalline glass ceramic fiber core; a cladding surrounding said core, such that migration of component elements between the cladding and the core compositions are minimized by controlling the thermal parameters of the fiberization process.

19. A optical fiber of claim 18, wherein the migration of component elements are reduced such that the interface between the core and cladding does not adversely affect transmission and waveguiding in the core.

20. A optical fiber of claim 18, wherein the fiber is drawn at a temperature above crystallization of the core composition, while maintaining the cladding material below its crystallization temperature.

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21. An optical communications system comprising a fiber made according to the method of claim 1.